

Tulane

Department of Mathematics
New Orleans, LA 70118
November 25, 1996

email: mwm@math.tulane.edu
phone: (504) 862-3441
FAX: (504) 865-5063

Dr. Ralph Wachter
Program Director
Software Research Program, Code 311
Mathematical, Computer and
Information Science Division
Office of Naval Research
800 North Quincy Street
Arlington, VA 22217-5660

Dear Dr. Wachter:

This is the final project report for the contract No. N00014-96-1-0709 that I was PI on. The contract was for support of the Twelfth Workshop on the Mathematical Foundations of Programming Semantics, which took place at the University of Colorado, Boulder from June 3 to June 5, 1996. The workshop featured invited addresses by six internationally recognized researchers, one special session, and forty talks contributed by participants. In all there were 69 participants from all over the world. The *Proceedings* of the meeting will comprise a special issue of the journal, *Theoretical Computer Science*, and it will be comprised of papers which are submitted by the participants and that will be refereed to the usual standards of *TCS*.

In addition to supporting MFPS 12, the funds in this grant also helped support a Workshop on Concurrency that took place at Tulane University, as well as a short workshop on Semantics and Security that also took place in New Orleans, in September of this year. The concurrency workshop consisted of visits by several researchers who collaborated with me on various aspects of my research program, and the workshop took place over a period of about two months. Details of those researchers who were supported by these funds, and about their visits to Tulane are presented in the attached report.

We wish to express once again our thanks to ONR for providing us with this much-needed support. ONR has been a continuing supporter of the MFPS series, and we believe has contributed greatly to the success and world-wide recognition it receives.

Best regards,

Michael Mislove

Michael Mislove
Professor

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DTIC QUALITY INSPECTED 4

19961202 138

Report on Conference Support Contract
No. N00014-96-1-0709
Michael Mislove, Principal Investigator
Mathematics Department
Tulane University

Summary of Completed Project

The funding from ONR was used to support the invited speakers at the twelfth workshop on the Mathematical Foundations of Programming Semantics, to help support participants in the special session held during the meeting, and to underwrite general conference support costs, including support of graduate students, women and members of minority groups to participate in the meeting. This annual series of meetings provides a venue for mathematicians and theoretical computer scientists to meet and discuss problems of mutual interest.

In addition to supporting MFPS 12, the funds from this grant were used to support visits to Tulane by several researchers who also work in the areas close to Professor Mislove's interests, and to support a small workshop on Semantics and Security that took place in New Orleans in September. Details of these activities are reported below.

Detailed Information

The Twelfth Workshop on the Mathematical Foundations of Programming Semantics took place on the campus of the University of Colorado, Boulder from June 3 to June 5, 1996, and featured invited addresses by six international researchers, one special session devoted to honoring Peter Freyd on his 60th birthday, and forty one talks contributed by participants in the meeting. The invited speakers at the meeting were

Peter Freyd	(Penn),
Mel Fitting	(CUNY),
Matthew Hennessy	(Sussex),
Gerard Huet	(INRIA),
Andre Scedrov	(Penn),
Jeannette Wing	(CMU).

The conference attracted 69 participants from 11 countries, and the ONR grant helped provide support for the six invited speakers, for the participants in the special session, and for women and minority participants who participated in the meeting. The conference will

publish its *Proceedings* as a special issue of *Theoretical Computer Science*. This special issue will consist of journal-length papers submitted by the participants and refereed to *TCS*'s usual standards.

In addition to supporting MFPS 12, the funds in this grant were used to support a Workshop on Concurrency that took place at Tulane University over a period of about two months, and which was comprised of visits to Tulane by several researchers who collaborated with Professor Mislove on parts of his research program. These researchers included Professor Giuseppe Rosolini (*University of Genoa*) and Dr. Paul Gastin (*LITP, Université Paris VII*). Dr. Gastin visited Tulane for a period of about a month, and during this time he and Professor Mislove embarked on a research program directed at their common interests - Dr. Gastin's well-known work on *true concurrency* and Professor Mislove's work on domain theory and models for concurrency. The goal of the work is to find out if there is any advantage to using true concurrency in modeling concurrent languages, as oppose to the more traditional approach of resolving parallel composition by interleaving sequential compositions.

Lastly, the funds were used to help support a small workshop on Semantics and Security that was held in New Orleans from September 15 to September 17, 1996. The goal of the workshop was to acquaint participants with potential applications of semantics to security. In addition to Professor Mislove, the participants were

Steve Brookes	(CMU),
Connie Heitmeyer	(NRL),
Radha Jagadeesan	(Loyola, Chicago),
John McLean	(NRL),
G. M. Reed	(Oxford), and
A. W. Roscoe	(Oxford).

The aim for the participants in this workshop is to find areas of collaboration in their research that will focus on using semantic techniques to attack problems involving security in areas ranging from homogeneous to heterogeneous computing systems.

Mathematical Foundations of Programming Semantics and Concurrency Workshop

ONR award number: N00014-96-1-0709
Total amount awarded: \$15,000
Period of award: 3/1/96 - 9/30/96

Mathematical Foundations of Programming Semantics (MFPS XII 1996) - \$12,000

University of Colorado at Boulder
Boulder, CO
June 3 - 5, 1996

Number of Participants: 69 total
Faculty 59
Students 10

Number of Countries represented: 11
Canada
Denmark
France
Germany
Hungary
Italy
Japan
Netherlands
Portugal
United States
United Kingdom

Number of graduate students supported: 6
Haack, C.
Hu, H.
Ibraheem, H.
Kotov, S.
Loughry, B.
Resende, P.

Number of women supported: 2
Finkelstein, S.
Jourdan, S.
Wing, J.

Faculty participants supported other than
invited speakers:
Fiore, M.
Gastin, P.
Oles, F.
Rosolini, G.

Concurrency Workshop - \$3,000

Tulane University
New Orleans, LA
May - August 1996

Supported professional visiting participants: Gastin, P.
Rosolini, G.

Semantics workshop participants supported: Brookes, S.
Jagadeesan, R.
Reed, M.
Roscoe, B.

MFPS XII

Twelfth Conference on the Mathematical Foundations of Programming Semantics

University of Colorado
Boulder, CO USA
June 3 - 5, 1996



Partially Supported by the US Office of Naval Research

The Twelfth Workshop on the Mathematical Foundations of Programming Semantics will take place on the campus of the University of Colorado in Boulder, CO from June 3 to June 5, 1996. The invited speakers for the meeting are

Peter Freyd	<i>Penn</i>
Mel Fitting	<i>CUNY</i>
Matthew Hennessy	<i>Sussex</i>
Gerard Huet	<i>Inria</i>
Andre Scedrov	<i>Penn</i>
Jeannette Wing	<i>Carnegie-Mellon</i>

In addition to the invited talks, there will be one special session at the meeting, and the remainder of the program will consist of contributed talks by the participants. Time for the contributed talks will be allocated on a first-come, first-serve basis; parallel sessions may be used if there is a large number of requests that cannot be accommodated without them.

A *Proceedings* also is planned. As has been the case with previous MFPS Workshops, this will likely take the form of a special issue of the journal *Theoretical Computer Science*, devoted to journal-length papers on results related to those presented at the meeting. A *Call for Papers* for the special issue will be disseminated after the meeting.

In addition to supporting the workshop overall, the support being provided by the Office of Naval Research makes funds available to help offset expenses of graduate students. Women and minorities also are encouraged to inquire about possible support to attend the meeting.

Registration Information

Detailed information about registration and accommodations now is available. If you wish to register for the meeting, follow the link.

If you have questions about the meeting, send email to us at: mfps@math.tulane.edu.

List of Participants

David B. Benson (abstract p. 8)

School of Electrical Engineering and Computer Science
Washington State University
Pullman, WA 99164-2752
dbenson@eecs.wsu.edu

Richard Blute

Mathematics Department
University of Ottawa
585 King Edward
Ottawa, Ontario K1N 6N5
CANADA
rblute@mathstat.uottawa.ca

Stephen Brookes (abstract p. 8 and 9)

School of Computer Science
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213
brookes@cs.cmu.edu

Robin Cockett (abstract p. 10)

University of Calgary
Department of Computer Science
2500 University Drive NW
Calgary, Alberta T2N 1N4
CANADA
robin@cpsc.ucalgary.ca

John Cowles

Department of Computer Science
University of Wyoming
P. O. Box 3682
Laramie, WY 82071
cowles@meru.uwyo.edu

Denis Dancanet

Computer Science Department
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213-3890
dancanet@cs.cmu.edu

Abbas Edalat (abstract p. 10)

Department of Computing
Imperial College
180 Queen's Gate
London SW7 2BZ,
UNITED KINGDOM
ae@doc.ic.ac.uk

Zoltan Ésik (abstract p. 10)

Department of Computer Science
Attila József University
P. O. Box 652
6701 Szeged
HUNGARY
esik@inf.u-szeged.hu

Stacy Finkelstein (abstract p. 12)

Mathematics Department
University of Ottawa
585 King Edward
Ottawa, Ontario K1N 6N5
CANADA
sfinkel@csi.uottawa.ca

Marcelo Fiore (abstract p. 12)

Department of Computer Science
King's Buildings
Edinburgh EH9 3JZ
SCOTLAND
mf@dcs.ed.ac.uk

Melvin Fitting (abstract p. 12)

Mathematics and Computer Science Department
Herbert H. Lehman College CUNY
Bronx, NY 10468
mlf@cunyvm.cuny.edu

Bob Flagg (abstract p. 13)

Department of Mathematics and Statistics
University of Southern Maine
96 Falmouth St.
Portland, ME 04103
flagg@usm.maine.edu

Peter Freyd (abstract p. 13)

University of Pennsylvania
Philadelphia, PA 19104-6389
pjf@saul.cis.upenn.edu

Paul Gastin (abstract p. 14)

LITP - IPB Université Paris
72, place Jussieu
F-75251 Paris Cedex 05
FRANCE
Paul.Gastin@litp.ipb.fr

Dan Ghica

Department of Computing and Information Science
Queen's University
Kingston, Ontario, K7L 3N6
CANADA
ghica@qucis.queensu.ca

Christian Haack

Kansas State University
Department of Computer and Information Science
234 Nichols Hall
Manhattan, KS 66505-2302
haack@cis.ksu.edu

Esfan Haghverdi

Department of Mathematics
University of Ottawa
585 King Edward
Ottawa, Ontario K1N 6N5
CANADA
ehaghver@csi.uottawa.ca

Matthew Hennessy (abstract p. 14)
COGS, University of Sussex
Falmer Brighton BN1 9QH
UNITED KINGDOM
matthewh@cogs.sussex.ac.uk

Claudio Hermida (abstract p. 15)
Department of Mathematics and Statistics
McGill University
805 Sherbrooke Street, West
Montreal, Quebec, H3A 2K6
CANADA
hermida@triples.math.mcgill.ca

Eichi Horita (abstract p. 15)
NTT Communication Science Laboratories
2-2, Hikaridai, Deika-Cho, Soraku-Gun
Kyoto 619-02
JAPAN
horita@progn.kecl.ntt.jp

Hongde Hu (abstract p. 15)
Department of Mathematics
University of Quebec at Montreal
C. P. 8888 Succ. A,
Montreal, PQ, H3C 3P8
CANADA
hu@math.uqam.ca

Gerard Huet (abstract p. 15)
INRIA Rocquencourt 10P105
78153 Le Chesnay Cedex
FRANCE
Gerard.Huet@inria.fr

Hans Hüttel (abstract p. 15)
Department of Mathematics and Computer Science
Fredrik Bajersvej 7E
Aalborg University
9220 Aalborg
DENMARK
hans@iesd.auc.dk

Husain Ibraheem
Kansas State University
Department of Computing and Information Science
234 Nichols Hall
Manhattan, KS 66505-2302
husaini@cis.ksu.edu

Alan Jeffrey (abstract p. 16)
COGS University of Sussex
Brighton BN1 9QH
UNITED KINGDOM
alanje@cogs.susx.ac.uk

Sofia Jourdan (abstract p. 16)
Department of Computing
Imperial College
180 Queens Gate
London SW7 2BZ
UNITED KINGDOM
isj@doc.ic.ac.uk

Mathias Kegelmann (abstract p. 17)
School of Computer Science
The University of Birmingham
Edgbaston Birmingham B15 2TT
UNITED KINGDOM
M.Kegelmann@cs.bham.ac.uk

Richard Kieburz (abstract p. 17)
National Science Foundation
4301 Wilson Science Foundation
Arlington, VA 22230
rkieburz@nsf.gov

Yoshiki Kinoshita (abstract p. 17)
Electrotechnical Laboratory
1-1-4 Umezono
Tsukuba-shi Ibaraki, 305
JAPAN
yoshiki@etl.go.jp

Sergey Kotov
Kansas State University
Department of Computing and Information Science
234 Nichols Hall Manhattan, KS 66506-2302
kotov@cis.ksu.edu

Marta Kwiatkowska (abstract p. 16)
School of Computer Science
The University of Birmingham
Edgbaston Birmingham B15 2TT
UNITED KINGDOM
M.Z.Kwiatkowska@cs.bham.ac.uk

Rom Langerak
University of Twente
Department of Computer Science
P. O. Box 217
NL-7500 AE Enschede
THE NETHERLANDS
langerak@cs.utwente.nl

Brian Loughry
Computer Science and Mathematics
University of Colorado at Boulder
Campus Box 430
Boulder, CO 80309-0430
loughry@rintintin.Colorado.EDU

Michael Main
Computer Science Department
University of Colorado at Boulder
Campus Box 430
Boulder, CO 80309-0430
main@colorado.edu

Pasquale Malacaria (abstract p. 9)
Imperial College
Department of Computing
180 Queen's Gate
London SW7 1AZ
UNITED KINGDOM
pm5@doc.ic.ac.uk

Austin Melton
Department of Computer Science
Michigan Technological University
Houghton, MI 49931
austin@mtu.edu

Michael W. Mislove (abstract p. 18)
Department of Mathematics
Tulane University
New Orleans, LA 70118
mwm@math.tulane.edu

Philip Mulry (abstract p. 19)
Department of Computer Science
Colgate University
Hamilton, NY 13346
phil@CS.COLGATE.EDU

David Naumann (abstract p. 19)
Department of Computer Science
Southwestern University
Georgetown, TX 78626
naumann@cs.utexas.edu

Cyrus F. Nourani (abstract p. 19)
Computer Science Department, UCSB
Santa Barbara, CA 93106
73244.377@Compuserve.Com

Susan Older
Carnegie Mellon University
Computer Science Department
5000 Forbes Avenue
Pittsburgh, PA 15213-3891
sueo@cs.cmu.edu

Frank Oles (abstract p. 19)
IBM, T. J. Watson Research Center
P. O. Box 218
Yorktown Heights, NY 10598
oles@watson.ibm.com

Jim Otto (abstract p. 20)
299 N. Dunton Avenue, Apt. 427
Arlington Heights, IL 60004-5971
otto@triples.math.mcgill.ca

John Power
Department of Computer Science
King's Buildings
Edinburgh EH9 3JZ
SCOTLAND
ajp@dcs.ed.ac.uk

Vaughan Pratt (abstract p. 20)
Department of Computer Science
Gates 4B
Stanford, CA 94305-9045
pratt@cs.stanford.edu

Lutz Priese (abstract p. 20)
University Koblenz
Rheinalu D-56075
Koblenz
GERMANY
priese@uni-koblenz.de

Pedro Resende (abstract p. 21)
IST - Department of Mathematics
Av Rovisco Pais 1000
Lisboa
PORTUGAL
pmr@math.ist.utl.pt

John Reynolds
Computer Science Department
Carnegie Mellon University
Pittsburgh, PA 15213
John.Reynolds@cs.cmu.edu

Kim Ritter Wagner (abstract p. 13 and 16)
University of Cambridge Computer Laboratory New
Museums Site
Pembroke Street
Cambridge CB2 3QG
UNITED KINGDOM
Kim.Wagner@cl.cam.ac.uk

Edmund P. Robinson (abstract p. 22)
Department of Computer Science
Queen Mary and Westfield College
Mile End Road London E1 4NS
UNITED KINGDOM
edmundr@dcs.qmw.ac.uk

Giuseppe Rosolini (abstract p. 22)
DIMA/DISI via Dodecaneso 35
16146 Genova
ITALY
rosolini@disi.unige.it

James S. Royer
School of Computer and Information Science
Syracuse University
Syracuse, NY 13244
royer@top.cis.syr.edu

Katherine St. John (abstract p. 22)
Department of Mathematics
University of Pennsylvania
Philadelphia, PA 19101
stjohn@math.upenn.edu

Vijay Saraswat (abstract p. 23)
3333 Coyote Hill Road
Palo Alto, CA 94304
saraswat@parc.xerox.com

Andre Scedrov (abstract p. 24)
Department of Mathematics
University of Pennsylvania
209 South 33rd Street
Philadelphia, PA 19104-6395
scedrov@cis.upenn.edu

David Schmidt
Computing and Information Sciences Department
234 Nichols Hall
Kansas State University
Manhattan, KS 66506
schmidt@cis.ksu.edu

Peter Selinger (abstract p. 24)
Department of Mathematics
University of Pennsylvania
209 S. 33rd Street
Philadelphia, PA 19104-6395
selinger@math.upenn.edu

Dieter Spreen (abstract p. 25)
Fachbereich Mathematik Theoretische Informatik
Universitat Siegen
57068 Siegen
GERMANY
spreen@informatik.uni-siegen.de

Allen Stoughton
Department of Computing and Information Sciences
Kansas State University
234 Nichols Hall
Manhattan, KS 66506
allen@cis.ksu.edu

Philipp Sunderhauf (abstract p. 13)
Department of Mathematics and Statistics
University of Southern Maine
Portland, ME 04103
PSUNDER@payson.usmcs.maine.edu

Makoto Takeyama
Department of Computing and Information Science
Queen's University
Kingston, Ontario K7L 1S3
CANADA
makoto@qucis.queensu.ca

Bob Tennent
Department of Computing and Information Science
Queen's University
Kingston, Ontario K7L 3N6
CANADA
rdt@qucis.queensu.ca

Franck van Breugel
Universita di Pisa
Dipartimento di Informatica
Corso Italia 40
56125 Pisa
ITALY
franck@di.unipi.it

Dennis Volpano (abstract p. 25)
Department of Computer Science
Naval Postgraduate School
Monterey, CA 93943
volpano@cs.nps.navy.mil

Scott A. Whitmire
Boeing Commercial Airplane Group
P. O. Box 3707
MS 6C-FL
Seattle, WA 98124-2207
dsd048@kvg.bems.boeing.com

Glen Whitney (abstract p. 25)
Department of Mathematics
University of Michigan
Ann Arbor, MI 48109
gwhitney@umich.edu

Jeannette M. Wing (abstract p. 26)
Computer Science Department
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213-3891
wing@cs.cmu.edu

Krzysztof Worytkiewicz (abstract p. 26)
worytkie@di.epfl.ch

Robert Kim Yates (abstract p. 26)
Institute for Scientific Computing Research
Lawrence Livermore National Laboratory I-306
P. O. Box 808
Livermore, CA 94550
rkyates@llnl.gov

MFPS

Schedule of Presentations and Workshop Events

Monday, June 3, 1996

8:00 AM	<i>UMC Aspen Rooms</i>	CONTINENTAL BREAKFAST
8:25 AM	<i>UMC 157</i>	WELCOME
8:30 AM	<i>UMC 157</i>	Stephen Brookes, Carnegie Mellon University <i>Parallel Algol: Combining Procedures with Parallelism</i> (abstract on p. 8)
9:00 AM	<i>UMC 157</i>	Hans Hüttel, Aalborg University <i>Objects as Mobile Processes</i> (abstract on p. 15)
9:30 AM	<i>UMC 157</i>	Zoltan Ésik, Attila József University <i>Independence of the Group Axioms for Iteration</i> (abstract on p. 10)
10:00 AM	<i>UMC Aspen Rooms</i>	BREAK
10:30 AM	<i>Sibell Wolle Fine Arts N141</i>	INVITED ADDRESS Gerard Huet, INRIA Rocquencourt <i>Regular Bohm Trees</i> (abstract on p. 15)
11:30 AM	<i>Sibell Wolle Fine Arts N141</i>	Abbas Edalat, Imperial College <i>A Computational Model for Metric Spaces</i> (abstract on p. 10)
12:00 NOON	<i>UMC Aspen Rooms</i>	LUNCH
1:20 PM	<i>Sibell Wolle Fine Arts N141</i>	INVITED ADDRESS Mel Fitting, City University of New York <i>Logic Programming Semantics</i> (abstract on p. 12)
2:30 PM	<i>UMC 157</i>	Pasquale Malacaria, Imperial College <i>Relative Definability of Boolean Functions via Hypergraphs</i> (abstract on p. 9)
OR	<i>UMC 158</i>	Philip Mulry, Colgate University <i>A CCC Construction for Categories of Partial Maps</i> (abstract on p. 19)

(MONDAY SCHEDULE CONTINUED ON NEXT PAGE)

Monday, June 3, 1996 (continued)

3:00 PM	<i>UMC</i> <i>Aspen Rooms</i>	<i>BREAK</i>
3:30 PM	<i>UMC 157</i>	David Naumann , Southwestern University <i>A Rational Imperative Language</i> (abstract on p. 19)
	OR <i>UMC 158</i>	Robin Cockett , University of Calgary <i>Shape Rings</i> (abstract on p. 10)
4:00 PM	<i>UMC 157</i>	Denis Dancanet , Carnegie Mellon University <i>Programming Language Expressiveness and Circuit Complexity</i> (abstract on p. 9)
	OR <i>UMC 158</i>	Glen Whitney , University of Michigan <i>Extensional Non-deterministic Recursion</i> (abstract on p. 25)
4:30 PM	<i>UMC 157</i>	Yoshiki Kinoshita , Electrotechnical Laboratory, Japan <i>Data Refinement and Algebraic Structure</i> (abstract on p. 17)
	OR <i>UMC 158</i>	Cyrus Nourani , METAAI <i>The Tree Amplification Principle</i> (abstract on p. 19)
5:00 PM	<i>UMC 157</i>	Dieter Spreen , Universitaet Siegen <i>Finitely Generated Rank-Ordered Sets are a Model of Type:Type</i> (abstract on p. 25)
	OR <i>UMC 158</i>	Vaughan Pratt , Stanford University <i>Stochastic Manifolds</i> (abstract on p. 20)
6:00 PM	<i>Old Main</i> <i>Heritage Center</i>	RECEPTION HONORING PETER FREYD

Tuesday, June 4, 1996

8:00 AM	<i>UMC</i> <i>Aspen Rooms</i>	<i>CONTINENTAL BREAKFAST</i>
8:30 AM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	<i>INVITED ADDRESS</i> Andre Scedrov , University of Pennsylvania <i>Linear Logic Proof Games and Optimization</i> (abstract on p. 24)
9:30 AM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	Stacy Finkelstein , McGill University <i>Applications of Tau Categories</i> (abstract on p. 12)
10:00 AM	<i>UMC</i> <i>Aspen Rooms</i>	<i>BREAK</i>

(TUESDAY SCHEDULE CONTINUED ON NEXT PAGE)

Tuesday, June 4, 1996 (continued)

10:30 AM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	Edmund Robinson , Queen Mary and Westfield College <i>Enriched Categories and Algebraic Compactness</i> (abstract on p. 22)
11:00 AM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	Marcelo Fiore , University of Edinburgh <i>Enrichment and Representation Theorems for Categories of Domains and Continuous Functions</i> (abstract on p. 12)
11:30 AM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	Guiseppe Rosolini , Universita di Genoa <i>Models of Synthetic Domain Theory</i> (abstract on p. 22)
12:00 NOON	<i>UMC</i> <i>Aspen Rooms</i>	LUNCH
1:20 PM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	INVITED ADDRESS Jeannette Wing , Carnegie Mellon University <i>Mathematics for Software Engineering</i> (abstract on p. 26)
2:30 PM	<i>UMC 157</i>	Bob Flagg , University of Southern Maine <i>A Logical Approach to Quantitative Domain Theory</i> (abstract on p. 13)
OR	<i>UMC 158</i>	Richard Kieburtz , NSF and Oregon Graduate Center <i>Encapsulated Effects</i> (abstract on p. 17)
3:00 PM	<i>UMC</i> <i>Aspen Rooms</i>	BREAK
3:30 PM	<i>UMC 157</i>	Michael Mislove , Tulane University <i>A New Theorem on Adjunctions with an Old Application</i> (abstract on p. 18)
OR	<i>UMC 158</i>	Ed Brinksma and Joost-Pieter Kotoen , Universite Twente <i>(Paper presented by R. Langerak)</i> <i>Disjunctive Causality</i> (abstract on p. 8)
4:00 PM	<i>UMC 157</i>	Philipp Sunderhauf , University of Southern Maine <i>Representation of Quantitative Domains</i> (abstract on p. 13)
OR	<i>UMC 158</i>	Krzysztof Worytkiewicz , EPFL, Lausanne <i>Abstract Interpretation of Polymorphically Typed Languages</i> (abstract on p. 26)
4:30 PM	<i>UMC 157</i>	Mathias Kegelmann , University of Birmingham <i>Factorization Systems on Domains</i> (abstract on p. 17)
OR	<i>UMC 158</i>	Dennis Volpano , Naval Postgraduate School <i>Towards Type Systems for Secure Remote Evaluation</i> (abstract on p. 25)

(TUESDAY SCHEDULE CONTINUED ON NEXT PAGE)

Tuesday, June 4, 1996 (continued)

5:00 PM	UMC 157	Pedro Resende , Instituto Superior Tecnico, Portugal <i>Quantales, Finite Observations and Strong Bisimulation</i> (abstract on p. 21)
	OR	Robert Kim Yates , Lawrence Livermore National Lab <i>Causal Continuity of Non-monotonic Processes</i> (abstract on p. 26)
7:00 PM	<i>The Broker Inn</i>	CASH BAR (7 PM) CONFERENCE BANQUET (7:30 PM)

Wednesday, June 5, 1996

8:00 AM	UMC Aspen Rooms	CONTINENTAL BREAKFAST
8:30 AM	UMC 157	Paul Gastin , LITP, Paris <i>Resource Traces: A Domain for Processes Sharing Exclusive Resources</i> (abstract on p. 14)
9:00 AM	UMC 157	Kim Ritter Wagner , Cambridge University <i>Variations on Fixed-Point Theorems for Semantics</i> (abstract on p. 16)
9:30 AM	UMC 157	Vijay Saraswat , Xerox Parc <i>Truly Concurrent Constraint Programming</i> (abstract on p. 23)
10:00 AM	UMC Aspen Rooms	BREAK
10:30 AM	Sibell Wolle Fine Arts N141	INVITED ADDRESS Matthew Hennessy , University of Sussex <i>A Fully Abstract Denotational Model for the Pi-Calculus</i> (abstract on p. 14)
11:30 AM	Sibell Wolle Fine Arts N141	Alan Jeffrey , University of Sussex <i>Linear Types for Higher-order Processes with Unique Name Generation</i> (abstract on p. 16)
12:00 NOON	UMC Aspen Rooms	LUNCH

(WEDNESDAY SCHEDULE CONTINUED ON NEXT PAGE)

Wednesday, June 5, 1996 (continued)

1:20 PM	<i>Sibell Wolle</i> <i>Fine Arts N141</i>	INVITED ADDRESS Peter Freyd , University of Pennsylvania <i>Paracategories, Paramathematics</i> (abstract on p. 13)
2:30 PM	<i>UMC 157</i>	Frank Oles , IBM Thomas J. Watson Research Center <i>An Application of Lattice Theory to Knowledge Representation</i> (abstract on p. 19)
OR	<i>UMC 158</i>	Katherine St. John , University of Pennsylvania <i>Recursion on Finitely Generated Structures</i> (abstract on p. 22)
3:00 PM	<i>UMC</i> <i>Aspen Rooms</i>	BREAK
3:30 PM	<i>UMC 157</i>	Marta Kwiatkowska , University of Birmingham <i>Fair Recursion in Synchronous CCS</i> (abstract on p. 16)
OR	<i>UMC 158</i>	Peter Selinger , University of Pennsylvania <i>Henkin Representations and Polymorphism</i> (abstract on p. 24)
4:00 PM	<i>UMC 157</i>	Eiichi Horita , NTT Communications Science Laboratories <i>Self-Interpretation in an Extension of CCS with Parametric Channels</i> (abstract on p. 15)
OR	<i>UMC 158</i>	James Otto , McGill University <i>Bicategories for Logic Programming</i> (abstract on p. 20)
4:30 PM	<i>UMC 157</i>	Claudio Hermida , McGill University <i>Simulations as Modules</i> (abstract on p. 15)
OR	<i>UMC 158</i>	Hongde Hu , Université de Quebec <i>Softness, Coherence Spaces and Free, Bicomplete Categories</i> (abstract on p. 15)
5:00 PM	<i>UMC 157</i>	Lutz Priese , Universitaet Koblenz <i>Compositional Petri Net Semantics</i> (abstract on p. 20)
OR	<i>UMC 158</i>	David Benson , Washington State University <i>Stone Duality between Queries and Data</i> (abstract on p. 8)

END OF PROGRAM

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4102, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	11/30/96	Final - March 1-September 30, 1996
4. TITLE AND SUBTITLE		5. FUNDING NUMBERS
Mathematical Foundations of Programming Semantics and Concurrency Workshop		N00014-96-1-0709 G
6. AUTHOR(S)		
Michael W. Mislove		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)		8. PERFORMING ORGANIZATION REPORT NUMBER
Tulane University - Uptown Campus Department of Mathematics 6823 St. Charles Ave. New Orleans, LA 70118		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER
Department of the Navy Office of Naval Research, Code 311 800 North Quincy Street Arlington, VA 22217-5660		
11. SUPPLEMENTARY NOTES		
Proceedings of the conference will be published in <u>Theoretical Computer Science, Special Issue.</u>		
12a. DISTRIBUTION/AVAILABILITY STATEMENT		12b. DISTRIBUTION CODE
Approved for public release. Distribution is unlimited		
13. ABSTRACT (Maximum 200 words)		
<p>Funds under this grant were used to support three principal activities. The first was the Twelfth Workshop on the Mathematical Foundations of Programming Semantics, which took place on the campus of the University of Colorado, Boulder from June 3 to June 5, 1996. The second was a series of visits by researchers to Tulane University during the two-month period June - July, 1996, to collaborate with the Principal Investigator on topics of common research interest. These visits formed the bulk of the Workshop on Concurrency listed in the title of the grant. Lastly, funds were used to help support participants in a small workshop in New Orleans from September 15 to September 17, 1996 which focused on applications of semantic techniques to problems in security of distributed computing systems.</p>		
14. SUBJECT TERMS		15. NUMBER OF PAGES
programming semantics, domain theory, concurrency, logic, category theory, mathematics, security		14
		16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT
unclassified	unclassified	unclassified
		20. LIMITATION OF ABSTRACT
		UL